[comments between them about diner food]

MONA JIMINEZ: Ok. So is today July 31st, 2007?

DAVE JONES: It is July 31st.

JIMINEZ: Ok. Great. And we're Owego with…

JONES: Dave Jones.

JIMINEZ: …and Mona Jiminez.

KATHY HIGH: Kathy High.

JIMINEZ: Ok, great.

JONES: Hi.

HIGH: Hi.

JIMINEZ: We're gonna kinda skip around a little bit, but want to start with your time in New York when you were at CTL Electronics, and a little bit about—I know you were only there a short period of time, but—what it was like to be there, and what that kind of— They were one of the primary vendors that a lot of artists worked with at that time, so…

JONES: Right.

JIMINEZ: …I thought you could fill us in a little bit about the situation there.

JONES: Sure. I worked there from about June to maybe mid-August, late August, of 1973. That was about six months before I met Ralph and Sherry and came to the TV Center. I knew somebody in New York that worked there, and they got me in as a technician. I had spent a week before that going to a training course at Sony on how to repair half-inch video equipment. It's a one-week intensive training course that they gave back then. And once I got out of that, then I was looking for a place to work. And so I got a job as a bench technician at CTL.

Basically, people would bring in their video recorders, and they would need adjustment or they would have some damage that needed repairs. And there were three or four of us, I think, at that time, working there repairing cameras and recorders and different types of equipment. And Louie[sp?] also had a little studio about a block or two away, called The Egg Store, which was a small production studio used for making industrial videos and

JONES (Cont.): things like that. CTL was probably— of the different places selling

video equipment at the time in New York, it was the one that was kind of considered to

be artist-friendly. A lot of the other places were just selling to industrial type places. And

Louie didn't really care what you did or who you worked for or what— You know, if you

had some money and you wanted to buy something, he'd sell it to you. So you know, he

was much more open to that. And would buy things to sell that were kind of in the vein of

things that artists and small video people would need.

JIMINEZ: Such as?

JONES: Like buying cases of really cheap half-inch reel-to-reel tapes, off brands that

were half the price of other brands; brands that no one had ever heard of, and none of the

other places would sell. But he somehow found them and he would buy cases of them

and then sell them at half of what the Sony or 3M tapes would sell for. So it was a cheap

way to get tapes and get out there shooting.

JIMINEZ: You mentioned in a previous interview that George Brown was working in

the studio and had made a colorizer. How did that come about? Was that something that

happened while you were there?

JONES: It happened around the same time. George, I don't know how he met Louie, but

they had met at some point. And by the time I got there, George had pretty much built the

colorizer, and was installing it in the studio and was testing it out. And it was the first real

JONES (Cont.): colorizer I had seen in person. I had seen videotapes made on colorizers

before, but— Well, no, actually that's not true. But a month before I went to New York,

when I was staying with the Videofreex in Lanesville, they had an Eric Segal colorizer.

But it was a very simplistic one, compared to George's. George's was a quantizing

colorizer that divided the image into shades of gray. I believe it was eight shades of gray.

And each shade of gray had a red, green, and a blue knob. And so you would adjust the

RGB for each of the shades of gray of the original image. So an image would be divided

into bands, like color bands. And each band, you could adjust the colors.

JIMINEZ: So then that band would become, in the video image, that value on the gray

scale in the video[?]?

JONES: That shade of gray of the original image would become the color you would

tune up with the red, green, blue knobs. So it was eight rows of three knobs. And if you

picked the middle set of knobs, then the middle shade of gray of the original image, that

band of gray would become whatever color you picked up, you tuned up with the RGB

knob. The one at the end would be— the black would become that color; the other end,

white would become that color, and so on in between.

JIMINEZ: So how would that have differed from something like Eric Segal's?

JONES: Eric's was more of… Oh, how to describe it? It didn't quantize. It didn't divide the original image into specific shades of gray. It was more taking— based on the concept of how a color encoder worked, where if you looked at a vectorscope for video, you have two axes on the vectorscope. You have the R-Y and the B-Y. And the signals that were processed by Eric Segal's were feeding video into those axes. So the video image went through a rainbow of colors as the shades of gray changed. There was no—

JIMINEZ: And you would adjust the—

JONES: You kind of adjust the mix of which axis it was going on. And so that kind of shifted the rainbow as kind of a cross section on the vectorscope. So you would get it transitioning red, yellow, green, blue and back again, based on the shade of gray, and smoothly transitioning color to color, as the shades of gray changed.

JIMINEZ: I see.

JONES: Whereas with George Brown's, it was almost like a keyer. It had very distinct edges, and the one color just suddenly stopped and then the next color started. So it was a very different look.

JIMINEZ: Yeah. If you had seen other colorizers and people were making other colorizers, they would've been these custom boxes, or [inaudible]

JONES: Pretty much at that point, there wasn't any demand for colorizers. The only commercial product that I was aware of where they actually made a number of them was also a quantizing colorizer. I think it was Colorado Video that was making it. And it was used for medical use. For taking the shades of gray from an X-ray and turning them into distinct colors in different regions, so that you could kind of make the different shades of gray of the X-ray stand out.

JIMINEZ: And how would you have learned about something like that?

JONES: I learned about that later, after the fact, when Ralph got another device from the same company and I started exploring what that company was selling…

JIMINEZ: I see.

JONES: …and saw that product.

JIMINEZ: So getting back to the colorizer that George Brown built for CTL, why do you think Louie would've been supporting something like that? To sell to artists?

JONES: No, I think it was special effects to use in the studio. The studio was doing industrial videos and it was also doing videos for artists on a commercial basis. And they had the typical type of SEG to do wipes and fades and those types of things. And I think he was looking for something different, something more unusual that would give him an

JONES (Cont.): edge over other small studios that were in New York. And so when

George proposed the idea, then I think he said, "Ok, let's build on it."

JIMINEZ: So there might be one in the basement now from CTL Electronics?

JONES: There probably is one somewhere. And I think they were talking at some point

about maybe manufacturing it; but as far as I know, it never got to that point. But they

may have made more than the one unit; they may have made a second or third unit, I

don't know. But there was definitely that one. And George didn't own it at that point. He

had built it for CTL for The Egg Store.

JIMINEZ: I see.

JONES: So CTL owned it.

JIMINEZ: So then you left that job and came up to ETC?

JONES: Not directly. I was really not liking New York a lot, so I had— When I first

came to New York State, I had stayed at the Videofreex place in Lanesville. I had met

them in Europe a year, year-and-a-half before that. And so when I wanted to get out of

New York City, I decided to go back in the area where they were, and I rented a place

about a mile or so up the road from their place. And I set up Silver Bullet Video, as a

place to repair video equipment for people in that general area. In the general area,

JONES (Cont.): between Woodstock and Ulster County and that whole kind of— you

know, maybe thirty, forty miles in every direction from there, there were a dozen or two-

dozen people doing video. You know, and for that time frame, there was a fair amount of

video going on. And so I repaired cameras and recorders for people; I did modifications

to cameras, putting in adjustments for things that the cameras didn't have in the first

place, or putting switches and adjustments into the decks, that they didn't have; selling

battery packs. Different kinds of things like that.

JIMINEZ: So actually— Well, I said I wasn't going to ask you about modifications, but I

am. [they laugh] Now you've piqued my interest. So can you talk about cameras and

decks and what changes you might've made that would— and why they would be

made…

JONES: Sure.

JIMINEZ: …in terms of modifications?

JONES: Probably one of the most common ones that I did was a sensitivity adjustment

on the cameras. The cameras were not very low light cameras. They were basically—

The lens was the only adjustment you had. So a lot of times, you tried to go into a low

light situation and they would amplify to a point of just being noise. Or you went into a

bright light area, and the automatic gain controls just shut everything down. So in some

of those cameras, I put in a switch and a knob that'll allow you to override the automatic

JONES (Cont.): gain control and just manually control the setting for the two. You have

to remember, this was the days of tubes in the cameras for the pickup, rather and solid-

state devices like CCDs. So you basically had this glass tube with a voltage applied to the

back. And as the voltage changed, it changed the sensitivity of the pickup. So I was able

to tap into where that voltage was, and put it on a knob to allow somebody to basically

adjust the sensitivity of the camera.

JIMINEZ: Would these be like the cameras that came with the Portapaks?

JONES: Yeah. Yeah.

JIMINEZ: Like the Sony 3400, for instance?

JONES: Yeah. That was almost always what the camera was that I modified.

JIMINEZ: Now, would you be able to modify the camera also? I know there were some

cameras where— some modifications that were done to cameras where they could switch

the raster up and down.

JONES: Yeah. I mean, that was a pretty simple thing to do, because the pickup tube

inside the cameras worked just like a monitor worked. It had a set of coils around it. And

one set of coils was the horizontal, one was vertical. So it was very simple to reverse the

JONES (Cont.): wires for that and flip the image up and down or flip it side to side. So that was another modification. Not as often in demand, but…

JIMINEZ: So, I mean, somebody could be shooting and they could then decide to switch that switch, and so they would be looking in a normal view, at the…?

JONES: Right. More often, it would be a situation where somebody might hang the camera from a ceiling, and instead of the image being upside-down, they could then switch the flip and it would be right-side-up again. You know, things like that, where it was typically compensating for the way that the camera was mounted, to get back to a normal image, rather than just flipping it, keeping the camera upright and flipping the image.

JIMINEZ: As an image kind of manipulation.

JONES: Yeah. I mean, it was something— some people would do it as a way of flipping and image, and might have multiple cameras in a shoot, where one image was normal, one was reversed. The Videofreex did a fairly well known video back then where they used two images; one was normal and one was reversed. They were doing a kind of a mirroring effect. David Court did it a number of times in some videos.

JIMINEZ: Do you remember the names of any of those videos, by any chance?

JONES: I just barely remember seeing them. [they laugh] No. I mean, some of their

images, some of their tapes I saw while I was still in Europe, before I came back and

stayed there. And then while I was staying there, they were making new tapes. And they

had their weekly TV show, and so they were showing tapes on that.

JIMINEZ: Right.

JONES: So I got to see a number of them in the five weeks or so that I stayed with them.

JIMINEZ: So what about modifications to decks? What would've been some—

JONES: Well, there were a couple of things. One was, again, overriding the AGC, but

this time for the audio. Putting in a volume control on a deck that didn't have any kind of

audio level control, so that you could control, you know, how strong or weak the audio

signal was that was coming in. Another one was to take some of the decks— There

weren't any really hardcore editing decks that were in the low price range. There were

decks that were considered editing decks, like the Panasonic 3130, which had the ability

to do assembly edits, but did not have the ability to do insert edits. It didn't really have a

flying erase head that was needed to really do proper insert edits. And so I did a

modification for that, where I put in a switch on[?] a coil that would allow the main erase

head for the tape to not erase the tape. And it was basically up to the video heads to kind

of be strong enough to override the signal already on the tape, and you would be able to

get an insert edit. Without that, when you went into the edit in that deck, you would end

JONES (Cont.): up cutting in fairly quickly; but when you cut out, you would have

maybe eight seconds of noise before your original image came back, because the erase

head was just a bulk erase head and it erased everything on the tape, as long as the button

was down to go into record. So that was a fairly common…

JIMINEZ: Yeah.

HIGH: I wish I'd had one of those. [they laugh]

JONES: I might still have one in my basement.

JIMINEZ: That is really good.

JONES: I think it's covered with rust and mold by now.

JIMINEZ: Oh, my God.

HIGH: It would've made my life a lot easier.

JIMINEZ: Yeah.

JONES: Yeah. You know, the higher end decks, like Sony's one-inch decks, had flying erase heads and did clean insert edits and stuff like that. But a lot of the smaller, cheaper ones, they had assembly edits but didn't have insert editing.

JIMINEZ: So do you think that other people were doing similar modifications or their own modifications?

JONES: Yeah. Yeah, there were a number of different people doing it. In fact, a lot of the modifications I did, I learned when I was at CTL, because other people were already doing similar kind of things. So a lot of them were just based on the concept of what they were doing there, so…

JIMINEZ: And I guess just listening to makers and…

JONES: Yeah, you know, technicians would talk to other technicians about what they'd done and different ideas they had and, you know, it was a fairly even flow of information. And I always kept my ears open when people were talking about that kind of stuff. Picked it up as easily as I could.

JIMINEZ: But I mean, where would you hear that kind of stuff? When you were working at CTL, obviously, you're running into a lot of people…

JONES: Yeah.

JIMINEZ: …and other video makers.

JONES: But even amongst the video people that I would meet around New York, there were certain people that were doing experiments. Even like Skip Blumberg, who wasn't really a technician, knew a certain amount technically about the equipment at the time. Same with Parry Teasdale. But in fact, when I was in Europe, we had a camera, a Sony camera that died. And Parry was in Paris visiting somebody, and we happened to be in Paris at the same time, when the camera died. Took it to him and he said, "Oh, you know, we ran into something like this last year with one of our cameras." And he helped us to fix the camera. Figured out what transistors blew, and we replaced them and the camera started working again.

JIMINEZ: Yeah, I remember working with, like, a friend who was a musician, who of course, you know, did troubleshooting with music equipment, trying to figure out how to get two 8 pins to talk to each other. [laughs] We weren't successful. [Jones laughs] But we tried, you know?

JONES: Right. Yeah. Well, I think it was pretty common in those days that [phone rings] as you were working— Excuse me. [he takes the call]

        Dave Jones Design. … Four channels, basically. … So you just [inaudible voice]

        start with any particular one and it—

No, it's the same as it's been. I haven't raised the prices for a long time.

HIGH: You haven't? I thought [inaudible]

JONES: I haven't. And I definitely haven't lowered— Well, and above.

HIGH: No, dropped. That's what I said.

JONES: I think I might've dropped them at one point, but only of the ones that were way up there at, like, fourteen and—

HIGH: Oh, really?

JONES: Fourteen, fifteen, sixteen, somewhere up there, I might've dropped them…

HIGH: Oh, ok.

JONES: …a hundred dollars. But for years, everything's been pretty much this price. There was a point where around—I forget at what point—eight or ten or twelve channels, I added a little more because it was a double high box. And then I backed off on doing that at some point. But I think that was 2003 or something. It was like four years ago…

HIGH: Oh, yeah. Yeah, yeah, yeah. I'm assuming[?] after that.

JONES: …something like that. So I don't think there's been a price change at all since

2003. There should be.

JIMINEZ: Yeah, there should be.

JONES: Costs keep going up, but…

JIMINEZ: Yeah.

JONES: You know?

WOMAN: We're rolling.

JONES: Ok.

JIMINEZ: Ok, so…

JONES: Well, partly what I was saying was that back in those days, the people that were

doing video, for the most part, had to at least learn a certain amount of tech to be able to

do it, because there weren't readily available technicians to help out. It was new to pretty

much everybody. And so just to be able to hook everything up, you had to do your own

tech work. And when your equipment broke down, you either had to take it to someplace

JONES (Cont.): like Sony and get it fixed, or you had to talk to whoever you could talk to about getting materials and trying to fix it yourself.

JIMINEZ: I know that *Radical Software* had regular, you know, articles about tech stuff. And were there others that served that kind of networking function, that you remember? In terms of print.

JONES: As far as publications? There was a— I don't know if they really had much in the way of tech type stuff. There was a publication called— I think it was something like *Dumping Ground*, Dumping Place. *Dumping Ground*, I think it was. That was put out by the April Video collective that was— Mostly, it was about networking. Mostly it was about, you know, who was doing what, and where they were. So it wasn't…

JIMINEZ: [inaudible] videographer.

JONES: …so much— Yeah. I mean, it said, you know, "There's a tech person here, there's video people here, there's a video collective living in this town." So it was kind of just telling you about everybody that was out there that was pretty much doing anything. And a lot of it was user contributed, so it was just— You know, people would say, "Ok, well, I'm over here doing this," someone else says, "I'm over there doing that." And then they just put it all in a loose publication and sent it back out. And so everybody started hearing about everyone else.

JIMINEZ: Great. So you arrived at the Center. I remember the story of you selling

batteries or something to Ralph and…

JONES: It started when I was doing Silver Bullet Video in the Catskills. And winter was

coming on, the winter of '73. And I was not getting enough work from the dozen or so

people in the area doing video. So I talked to the Videofreex about who else was doing

video in the state. And they had compiled a list—or had gotten ahold of a list

somewhere—of different people around the state that were doing video. So I created a

flier and sent it out, offering modifications and battery packs for Portapaks and repair

services, things like that. And as far as I remember, the only response I got from sending

out hundreds of fliers was a phone call from Ralph Hocking saying, "We need a couple

of these batteries, these nicad battery packs for the Portapaks." And so I built them, but

them together, and I drove them to Binghamton to deliver them, and met Ralph and

Sherry for the first time. And they bought the battery packs from me. And I came back to

the Catskills and settled in. And maybe a week later, maybe a little less, I got a call from

them saying, "Hey, how'd you like a regular job?" And they wanted somebody to do

their tech work at the TV Center. And since things were not looking that great, and the

snow was falling—that was probably November of '73, when I met them. So I agreed to

start working at the Center, the beginning of January '74…

JIMINEZ: Great.

JONES: …and moved to Binghamton.

JIMINEZ: So…

HIGH: Can I ask one question?

JIMINEZ: Yes.

HIGH: The battery packs, were these these belt battery packs you were talking about?

JONES: No.

HIGH: Or were they [inaudible]

JONES: [over High] Those were more what were used by movie companies. There was, like, the Cine 60 was a common one that had the batteries around in a belt. These were the equivalent— [inaudible voice] Sony sold these leather bricks that were about this big, that were full of nicad batteries for the Portapak, with a leather strap that you put over your shoulder. I sold basically the same thing, except I bought the batteries individually, and the charger separately, and I put them in these green army cloth bags that were vertical, with, you know, a green shoulder strap. So they were about the same size, a little bit bigger 'cause the batteries were maybe a little loose inside the thing. And you wore it over your shoulder as, like, a little army ammo bag or something, with a wire coming out that plugged into the side of the Portapak.

JIMINEZ: So one of the things we were interested in hearing about was— You know, because obviously, the TV Center is founded on this idea of— Or you know, it's very important, the idea of signal flow, and the artist's control of the signal, and machines talking to each other, and devices being connected. So I wonder if you could talk about what you found at the Center when you arrived, and specifically, how you saw the patching and the matrix kind of develop over time, to connect machines and to allow for artists to have that kind of control?

JONES: Ok. When I first got to the Center, there was not a lot of video equipment or audio equipment in the studio setup. There were a number of additional pieces of equipment that they had that were sometimes patched in, sometimes not. But there was just a kind of core setup of the Paik/Abe colorizer, Paik/Abe keyer, the Wobulator, and I think it was a Sony SEG. And for the most part, everything was pre-patched and then went out to a deck to record it. There were no timebase correctors in the studio in those days. If you wanted to feed a tape into the system, you pointed a camera at the monitor and you hooked up a player to that monitor, and you rescanned the image through a camera. They Paik/Abe and its keyer were pretty much pre-wired. So the output of the Paik/Abe went into the keyer, and then from there, went off to the SEG or to the recorder. Patching was done, basically, with just BNC cables on the backs of the machines. And if you wanted to change the patch, you got out behind the machines and you unplugged one cable and plugged in another one. There was no switching or patch system at all. It was all basically pre-wired. And if you wanted to change something, you went to the back of

JONES (Cont.): the machines, you connected the machines differently. And then

somebody, the next person, would end up reconnecting them the way they wanted them.

A little while after I got there, I went up to the fourth floor, which was kind of a storage

warehouse for the TV Center. Ralph bought a lot of different things and stored them up

there, things that weren't in use, in just day-to-day use. And one of the things I found up

there was an audio patch panel. So I brought that down and used it to at least connect

some of the different audio sources together. But there was still no video patching at that

point. We did have a— I believe we had a rack mount plate with some BNCs on it, that

we ended up putting a few of the machines into that and being able to connect a couple of

things directly to that, instead of having to go behind the machines. There were a couple

of places where there were audio jacks also on a panel. I'm trying to think. There were…

I think the— 'Cause there were a couple of oscillators that were used for, like, feeding

the Wobulator. And so there were some jacks on a panel where the oscillators would go

into the Wobulator. It was quite a while, I think, after that before we had any kind of

video patching.

I don't remember which came first, but there was, probably around '75, I built a video

switching matrix, a small one. I think it was eight input, eight output. Actually, it

might've been four in, eight out; I can't really remember at this point. Or it might've been

eight in, four out. [they laugh] Yeah, I'd have to think about that. It was a fairly

straightforward type of a switching device that just had push buttons on the front. And it

had little numeric readouts to show which input was going to that output. And so you

JONES (Cont.): would push the button to change point-to-point, the different signals.

And it was used to switch some signals around in the studio, and it was used for some

performances that Peer Boda and Meryl Blackman did in, let's see…

JIMINEZ: So that would've allowed, like…

JONES: I can't remember the name of the piece.

JIMINEZ: …real time switching that wouldn't have been possible earlier[?].

JONES: [over Jiminez] Yeah. It was used in a performance, where you could actually—

you could hit two or three buttons at once, and those channels would switch at the same

time. Or you could hit them sequentially and get them to switch that way.

JIMINEZ: So was the studio like a performance space, as well, a public performance

space, or more still a personal kind of space?

JONES: It wasn't really a public performance space, but it did happen a couple of times.

There were a couple of performances. There were some video presentations that

happened, video showings that happened there. Small audiences. It wasn't big enough to

have huge crowds, but there were some performance. There were a couple of

collaborative dance/video performances that I remember happening there. The Bill Jones

and Arnie Zanes dance group was—American Dance Asylum, I think it was called—was

JONES (Cont.): in town. And so they would come over. And they worked with Meryl

and Peer a couple times, did joint performances. And the switcher was often used in that

kind of stuff.

And then at some point, Ralph continued to buy a lot of surplus equipment of different

kinds, some from the state, some from industrial surplus, some from some local

companies. Like Singer-Link, at least back then, was a local company that did flight

simulators, and used video equipment in those. And Doron was another one that

became— I think they were a subdivision, originally, of Link, and split off as a separate

company. And they used video equipment in their simulators, driving simulators. And

Ralph managed to buy some equipment from one of them, used. Old video recorders,

cameras. And somewhere along the line we got this pin matrix, which was— It was a

panel with a series of holes in it and criss-cross connections underneath. And you took

these little pins that were like a plastic tube with a metal pin sticking out the bottom. And

when you put it into one of the holes, it connected the X and the Y rows of metal in the

matrix, so you could connect any input to any output by sticking a pin in the hole where

those crossed. And the pins came just as bare metal, where they just shorted the two

together, or they came with a resistor or a diode in the little handle of the pin. And so

when you put them in, you could connect several different inputs to a given output and

mix them together. Not just tying— you know, connecting one input to one output, but

you could blend them to some degree. It was a little haphazard, and you had to use the

right color of pin to get the blend, otherwise you just shorted the connections together.

But we used that for a long time, then, in the studio, because we were able to take every

JONES (Cont.): piece of video equipment in the studio and tie it into the matrix and get

signals coming in and signals going out. And very quickly—

JIMINEZ: What year?

JONES: It was probably '75. Maybe beginning of '76, but I think it was probably '75. A

lot of that stuff was happening in '75.

JIMINEZ: So that made a lot more things happen, if you could take multiple inputs

and—

JONES: Yeah. You could very quickly change things around. Instead of having to climb

behind all the equipment and move BNCs and stuff, you could patch. 'Cause the

Paik/Abe, for example, each of the inputs was a little different. One of the inputs was

weaker than the others, one of them had much stronger colors than the others. And so

either your cameras were pre-patched into those, and those cameras always had those

colors, or once the matrix was there, then you could change which camera went to which

input. Or if you had two or three cameras, you could choose which of the different inputs

on the Paik/Abe the same image went to, because blending, for example, input number

one and input number four gave you a very different look than blending input one and

input two, with the same image, because of the way that the different channels were fed

into the internal encoder of the colorizer. So it allowed you to fairly easily change the

look of things by being able to rearrange which cameras went into which devices. Plus,

JONES (Cont.): you could feed them into the different channels of the SEG and mix a colorized image with a non-colorized image, stuff like that.

Around that time, I was also modifying the SEG. The SEG was a very simple device and had wipes, but it had no keyer. And so I built a keyer into it. Made a of couple different medications so that you could key one channel on top of the other. I made a couple of changes where you could feed signals in through mini-jacks and use the oscillators to modulate or change the wipe patterns. So instead of manually adjusting the wipe, the oscillator would adjust the wipe for you. Ralph had a whole pile of surplus oscillators he had bought somewhere.

JIMINEZ: So is that a precursor to your Jones keyer thing, or…

JONES: Well, yeah. Actually, it was kind of one several different stages of it. I built a keyer as a stand-alone device. And then the next generation, the improved version went inside the SEG. And then I built another one that was improved on that, as a stand-alone device. And so it was kind of a progression of, you know, build one, build the next, build the next.

JIMINEZ: So there is no one definitive Jones keyer.

JONES: No, I think there've been about five or six generations of them, and each one was cleaner than the previous one. Although they've been pretty clean since, you know, fairly early on. I used high-frequency design techniques in designing it, which kept out a lot of the noise that similar devices from other people had had. So I learned— One of the people that would come to the TV Center occasionally was a design engineer for Singer-Link. And he designed very high-frequency video circuits for Singer. And so I learned from him, ways to change the electronics that would pass high-frequencies much better. And so using what I learned from him, it influenced a lot of my designs to be able to work with much higher frequencies than the video signal actually had. So it wouldn't introduce its own noise and frequency limiting, like most video circuits.

JIMINEZ: Right. So at the time when the pin matrix was introduced, there would've been what devices in the system? And then what was the next generation of video switching? Or do you remember?

JONES: Well, the pin matrix lasted a long time, so… I think we used the pin matrix until it died, until it wouldn't pass signals cleanly, and then we switched over to the cherry switch that we use now. I mean, the one we have now is obviously second or third generation, but we switched from the pin matrix to sliding switches. I don't think there was anything in between that.

JIMINEZ: And so what's the advantage to the sliding switches versus the pin?

JONES: Well, first, you don't lose the pins. You don't typically short multiple inputs to a given output. The slide switches, you're choosing for a given output what you want to feed into it. And so you have one choice. You can choose one of any of the possible sources to go to that device, to that input. Whereas the pin matrix, you could stick the pins anywhere, and fairly easily short-circuit things together. Sometimes that was a good thing, and sometimes it was a *really* bad thing.

JIMINEZ: How so?

JONES: Well, because you could damage circuits. Some circuits just are not meant to be shorted together like that. Especially if you have the outputs of two devices shorted together and they're trying to compete with each other. Some circuits just don't survive doing that.

HIGH: Right.

JIMINEZ: Now, I remember that you built your first A to D converter sometime in the early seventies. Maybe you could talk about sort of the introduction of digital into the studio. And also, in the meantime, you can tell us a little bit about your designs, which kind of went together, in a sense.

JONES: Sure. Ok. I was designing my colorizer. And in the process of doing that,

decided it needed some sort of a keyer in it that would take the image, and anything

above or below a certain shade of gray, it would clip that image. So I had worked out a

fairly clean circuit for clipping the video image. In reading a little bit about conversion, A

to D conversion and digital conversion in general electronics magazines and stuff, I

realized that a series of these clipping circuits tied together would give me basically an A

to D converter for video that would slice the image up into shades of gray and then turn it

into a digital number, a multi-bit digital number. And then feeding it back into a D to A

circuit would get it back to video. The electronics magazines I'd been reading were about

audio conversion analog to digital, and were using much slower types of converters.

Video was— there weren't really any single chips available at that point that would do

video A to D conversion, although there were some that came out around that time and

were extremely expensive.

JIMINEZ: What year would this have been?

JONES: '75. I think there was a chip that came out around that time, and it was six-

hundred-and-something dollars for the chip. And there was no way I could buy that. So I

was using these cheap little comparator chips and feeding them into a digital chip that

combined the outputs of sixteen of them. And this was something that I'd developed at

home on my own. It wasn't part of stuff at the TV Center. And so I built this circuit that

divided the image into sixteen shades of gray, and then basically put it back together

again. So you got back out the original video image, but now the shades of gray were

JONES (Cont.): stable. So everything between black and one-sixteenth of the image was now just black; and everything from that point to the next threshold was the next shade of gray. So it quantized the image, divided it into bands. And I played around with it a little bit, because between the A to D and the A, you had the four bits, where it was converted into a binary number; and by reversing those bits, you totally scrambled the shades of gray. So the sixteen shades of gray were not consecutive black to white, they were dumping all over the place. So it was black and then middle gray, and then dark gray, and then almost white, and so on. So it gave this kind of zebra striped appearance to an image. It ended up showing all sorts of little detail. Because in the original image, where you had minor steps from shade to shade, now you had major steps in the shades of gray, from shade to shade. So all the little detail, and all the noise and any other parts of the image now kind of stood out and were this kind of jumble of shades of gray.

So I played around with that idea a bit, and then decided, in reading about, once it was a digital number, four bit number, that I could feed it maybe into a memory chip and store it and hold it for a period of time. Because all this conversion was real time, so there was a lot of detail in the image. It was digitized as far as shades of gray, but not as far as time. So I got a very small memory chip, and I would just store the shade of gray for a few pixels, and then I would grab the next shade of gray, and then the next shade of gray. And I divided the image into sixty-four points across the line. So now the image was, like, sixty-four columns. And in each column, on each scan line, was a shade of gray for that portion of the scanline. So it had the full resolution vertically; but horizontally, it was divided into little segments. And then, by changing the way that the memory chip was

JONES (Cont.): timed, as it grabbed those sixty-four points across the line, I grabbed on

one line and played it back for the next set of lines. And that divided the image into sixty-

four by sixty-four blocks, where each block was then holding the shade of gray that came

from the upper corner of that block. So it was a live image, but it was now heavily

pixilated. It was now just this big, blocky image. And the circuit that did this was called a

line buffer, that basically just stored one line of the image, sixty-four points on that line,

repeated it for—I forget—sixteen or eight lines, and then it grabbed the next line and

repeated it again. So it created this kind of a big, blocky, pixel-looking image, which—

JIMINEZ: And do you have any visual documentation of that?

HIGH: Do you have schematics?

JONES: Well, I think I've got the *board* somewhere. You know, I *think*. [laughs]

HIGH: [inaudible]

JONES: I know I've got the A to D, because actually, I sold that to Gary Hill a couple

years later. But then when Woody and Steina were doing their Pioneers of Electronic Art

show, back in the nineties, I talked to Gary and he gave me the board back. So I at least

have the A to D converter. And I think I still have the line buffer, I'm not sure.

HIGH: Now, is that the one that you said Walter Wright made one tape of?

JONES: Yes.

HIGH: Ok.

JONES: Yeah. He did a thing with a Coke bottle, digitizing a Coke bottle. I have no idea

what happened to the tape. [laughs] As far as I know, no one's found it yet. But it's out

there somewhere, probably. It's either in Walter's collection or Ralph's got it in his pile

of stuff Walter gave him in the seventies, and nobody's ever looked through them enough

to find it.

JIMINEZ: So the line buffer didn't really have a use, like, in the Center or anything? It

never got implemented; it was an experiment.

JONES: [over Jiminez] No, it was never part of the TV Center's equipment. It was

something that I had built at home and brought into the Center to play with and to try out.

But it was never something that— It was the only one that I built, so… And it was mine,

so it never ended up in the studio at the Center.

JIMINEZ: So then you moved on to a frame buffer. In the meantime, does the Center

already start to deal somewhat with digital, or…?

JONES: Well, I moved to the frame buffer first. I stopped officially working for the TV

Center in, I think, '76. And in the beginning of '77, I moved to the Catskills, and Gary

Hill and I shared a place there for a while. And the intention was, he was going to put me

up and pay for the materials, and I was going to design some equipment that he could

then have and use; and at the same time, teach him how to duplicate the equipment, so he

could make more copies and have big piles of equipment. So one of the things, while I

was building some stuff, I— Well, first of all, I sold him the A to D, 'cause I needed

cash. And so I sold him by sixteen shade of gray A to D. And then there was a surplus

electronics company across the river. We were living in Barrytown. And in Kingston was

this surplus electronics place that had a big cardboard box, about this big, full of chips,

most of them leftovers from projects at IBM, where they pulled parts and threw 'em in

the box, and then they sold all their surplus stuff to this place. And I went in there one

day and, for forty dollars, I bought probably two-thousand used integrated circuits from

these guys, and brought 'em back and started sorting through. And there were some

memory chips in there. They weren't very *big* memory chips, but you know, they were

more than sixty-four points, they were a thousand points, and two-thousand, four-

thousand points, things like that. So I built a circuit using those, to make a sixty-four by

sixty-four frame buffer. So that instead of just capturing one line, it would capture sixty-

four lines and grab an entire frame. And played around with that a bit. And basically, you

could digitize the image through it. And you would see live images at sixty-four by sixty-

four; and then at any point, you could hit the button and freeze and image, and it would

hold it. And I believe the first time that I showed it to Gary, he wasn't there, and I pointed

a camera at my face and froze the image of my face. And then I left and went somewhere

JONES (Cont.): else. And he came in later that afternoon into the studio, and there was

my face frozen on the monitor. [they laugh] He re-used that trick a few months later,

when Steina came to visit. And he froze his face on the monitor, before bringing her back

to the house to take a look at the equipment.

HIGH: So this was actually a big deal. I mean, obviously.

JONES: Oh, yeah!

HIGH: Huge, big deal.

JONES: Yeah.

HIGH: Yeah.

JONES: Yeah, this was something that, you know…

HIGH: Was mind boggling.

JONES: …you would see it on TV, maybe, but it wasn't something that was readily

available to the small video person. So you know, we were definitely blown away by the

fact that it worked. And the A to D by itself, separate from the sixty-four by sixty-four,

by that point, was finely tuned to where it would actually, because it was so real time, it

JONES (Cont.): would pass color and rearrange the color. So besides turning out sixteen shades of gray, you could feed a color image and the sub-carrier shape of the video would get chopped up and the shades rearranged, and now you had wild colors all over the place. Or depending on the shades of gray you chose, when you rearranged it you'd get subtle colors or strong colors or a mix of both. And so I built a circuit in between the A to D and D to A called an ALU, which is a sort of a very simple mathematical digital chip used in digital processing. And it basically adds two numbers, subtracts two numbers. Very simple type of math type functions. And so I fed the A to D into one side of it and fed some switches into the other side of it, and then the output went to the D to A. And by changing the switches, you could change how the shades of gray got rearranged. And so you could end up with a positive, a negative, or just totally scrambled shades of gray. And when you did that with a color image, or even just a subtle amount of color mixed in with a black and white image, you would end up with all of these different colors instead of just a shade of gray, but still in this kind of quantized look. So you'd have large areas of an image, and they would all be this, like, pastel kind of a beige or something, and then another shade of gray next to that might be a bright red. So it was some fun stuff. Gary did a videotape, I think called Bath, or The Bath, or *Bathing*, something like that, that, that used that effect, that used that A to D and ALU unit.

JIMINEZ: Was that while you were living together…

JONES: Yeah.

JIMINEZ: … or later? Yeah. So now you had a lot of talks with other people to do

modifications of equipment. Were you in contact with other people who were trying to

build A to D, you know, line buffers and frame buffers and…?

JONES: I don't remember— No, we had— there were a number of us that were doing

technical work at places like the Center. In '75 and '76, there was a lot of conference

calls between people, that Parry Teasdale had arranged. And people would visit each

other, talk about technical stuff. But for the most part, it was all analog. There wasn't

really much in the way of digital stuff. And by the time I got the digital stuff working and

then left the Center, I was kind of out of that circle, other than occasionally visiting, like,

Chuck Kennedy at the Videofreex and stuff like that. Around that same time, people were

discovering computers. And so there was that side of digital that people were

discovering, but it wasn't for image generating. So…

JIMINEZ: Yeah. What would they have been discovering about computers at that point?

JONES: It was *very* simplistic kind of stuff. Chuck Kennedy got ahold of a computer.

And I remember sitting there watching him having to key programs in one byte at a time

on switches on the front on the front panel, where he would have a reference sheet, and

he would have to put these eight switches in a specific pattern, and then hit a button, and

that stored one byte. And then he would change the switches to another pattern, hit the

button; that would store the next byte. And he would have to do that two-hundred, three-

JONES (Cont.): hundred, five-hundred times to get a very small, simple little program in

the computer, before it would actually run anything.

JIMINEZ: And that wasn't necessarily running graphics.

JONES: No, that was—

JIMINEZ: Just running.

JONES: I mean, those were running very simple things. In some cases, they were maybe

putting out a square wave that would be used like an oscillator. And there were some

plug-in cards that some people had together around that time, I think around '76 or '77,

that were very simple kind of graphics cards. So you could put character patterns up or

blocks of solid colors in a position where a character would be on a TV screen.

JIMINEZ: So you might be able to, like, mix that in with, you know…

JONES: Yeah. You could make, like, character…

JIMINEZ: …a video image.

JONES: …generator type stuff, and very crude patterns of images. But that assumed that

you managed to get ahold of one of those kind of video cards, where were fairly rare.

JIMINEZ: So I'm hearing three different things. One is your work with the capture of a frame, which is a very big deal. The other is generating computer graphics that could be used with video. But I also understand there was also computer control of video. Are those three of the main themes that were…

JONES: The first computer the TV Center got, which was also in '76—or '77; I think it might've been '77—was the LSI-11, which was a single board version of the DEC PDP-11. And its basic function was recording and playing back control voltages. It wasn't really capable of making video. But because a lot of things in the studio at that point were control voltage—I built my colorizer all with control voltages; the SEG had a control voltage input for adjusting of the wipes; there were different— You know, the Wobulators could take oscillators. So there were a number of things that had control voltages. Oscillators and— that were also voltage control. And so the computer was set up with some voltage inputs and a number of voltage outputs, and some very simple software that was able to record and edit patterns of voltages. So you could, instead of just playing an oscillator that was one repeating shape, like a triangle wave or a sine wave, you could make a much more complicated pattern of voltages going up and down, and then play them back from the computer. And you could speed that up and slow that down. And that was the primary function of the LSI-11 at the studio, was basically not making video, but making control voltages and being able to play them back, and feed a control voltage in and record it, play it back faster or slower; or define a pattern and then play that pattern back.

JIMINEZ: And how successful was that LSI-11?

WOMAN: Wait, hold on.

JIMINEZ: Ok.

[end of CD one of two]

JIMINEZ: —ask my question and then…

HIGH: Yeah, yeah.

JIMINEZ: Well, maybe we should talk about interface. So how did— Well, I understand

that part of the introduction of the LSI-11—LSI-11, that's, yes what it's called…

JONES: Yeah.

JIMINEZ: …into the Center was to provide also a— not just put the computer in there,

but also provide an interface that was useful to the artists, so they could deal with it on a

knob kind of level, on a physical level versus a programming level. Is that right?

JONES: Right. Yes. Yeah, it was— We were writing the software that would make it work; and then once it was up and running, they would be able to just run the program and throw a couple of switches or turn knobs, and be able to play back the control voltage sequences. So they would be able to go into record mode and turn a knob in various patterns, and then throw the switch back and that pattern would come out through the control voltage output.

JIMINEZ: So would you be able, then, though, to actually send a pattern or a sequence of control voltages, or just individual control voltages? Just individual patterns?

JONES: Well, each output, you could adjust the wave shape, basically, record a voltage pattern. And I can't remember how many outputs the LSI-11 had, but it had multiple control voltage outputs. So you could have several outputs happening at the same time, going to different places in the system. It wasn't particularly easy to use. The software was fairly crude. The computer itself was a real pain to get booted in the first place. And so there were probably not a lot of people that used it. Probably only a handful really did anything with it.

JIMINEZ: Can you remember who some of them were? Or some of the works that might have come out of that?

JONES: No, not really. I wasn't really living in Binghamton at the time. That was

happening around the same time that I was with Gary in the Catskills. And I would come

back to Binghamton every week or two and check in, and write a little code, and you

know, see what the project was up to. At that point, Paul Davis was doing a lot of the

work on the thing. He did a lot of the assembly. Walter Wright was there doing a lot of

the layout and assembly. And I was just coming in and helping out and throwing my two

cents in every once in a while.

JIMINEZ: Was that the same time as the computer Sundays?

JONES: No, this was much before that.

JIMINEZ: Ok. So this was the first—

JONES: This was in the late seventies. It started in '77, went through, like, '78, '79,

around in that range. The TV Center moved to Owego in the middle of '79. And I don't

really remember that computer surviving much beyond that, as far as being used.

Sometime around '80 or '81, Ralph said to Paul David, "We need to go to the next step

here and, you know, get something a little more useful." Plus, he wanted something for

his own use at home in his studio, which he had been building up. And so Paul put

together a computer system similar to something he'd been working with at SUNY in

Binghamton, which was a Cromemco Z-2 computer. This was a kind of a more modern

microcomputer. In some ways, it was— The LSI-11 was made by one of these big

JONES (Cont.): companies that made computers for Boeing and all these other kind of places; whereas the Cromemco was kind of part of the small microcomputer generation and revolution that started in the late seventies. It was the next step beyond the kind that Chuck Kennedy had, with the switches on the front, where you had to really work at it to get a simple program in. This one actually had disk drives. And it had a graphics card and, you know, it had serial ports and— You know, it had most of the kind of things that a normal computer these days has. It had an operating system called CP/M that was becoming very popular back then. And there was a plug-in card for it that was available, which we got, called the D+7A, which was digital plus seven analog. And it allowed you to feed analog voltages out and have switches that went in, analog voltages that would go in, and digital pulses that would come out. So it basically was switches and knobs going in and pulses and analog voltages coming out. And so we used that and made a little box to interface with it and bring it out to jacks and knobs that we could turn and interface into the system. And then started writing different types of programs to work with it to do things, to feed voltages out and to record them—similar to what the LSI-11 had done, but much— It was much easier to write programs. So we ended up doing many more variations of programs using it.

And then at some point around then, once we started doing that, Ralph came across a video frame buffer board from a company out in California, that would plug into this computer. And it would capture frames of video into the computer. And so we started writing programs that would control that board using the knobs from the interface box. So you could adjust the speed of how often it captured an image or how fast it played

JONES (Cont.): back, and slow it down, speed it up. You could use it to adjust the

resolution of the captured image. Things like that. So it became…

JIMINEZ: So I mean, another—

JONES: …physical knobs to control the software that was controlling the hardware

inside the computer.

JIMINEZ: So another difference between the LSI and this— What was it called?

JONES: Cromemco.

JIMINEZ: Cromemco, was that because of the graphics card— Was it that the graphics

card that would enable the storing and playing back of the images, versus just control

voltages?

JONES: Yeah. Yeah. There was a graphics card, which was in the computer for going on

the screen, just so you could see what the computer was doing. But then there was also

the frame buffer card. And the frame buffer card was something that had video in and

video out, and could actually capture frames of video and put them back out. The

computer graphics card wasn't something that had a video output, it just was something

that stored a— or that displayed the characters when you type at the keyboard and that

kind of stuff. It was the computer screen…

JIMINEZ: Right.

JONES: …for controlling it. And actually, now that I think of it, there was something in between those two. After we got the Cromemco—I don't remember if got this right away, or fairly shortly afterwards—there was a plug-in board for it called the Dazzler. [Jiminez laughs] The Dazzler was a graphics type of a card, not very high resolution, but easily controllable, and put out standard video. So it had a recordable output, which the normal character generator type graphics card did not have. And the Dazzler could— I think it was maybe sixty-four by sixty-four graphics. And so we were able to create patterns on this, and put those patterns out as standard video and be able to record them and feed them into the system. It didn't have any way of really capturing video, but it was basically a pattern generator. It was for making colored patterns and squares. And I remember writing some software where you'd turn the knobs on the analog box to adjust kind of oscillations moving through the Dazzler to make patterns. And the Dazzler had enough memory in it that you could do sequences. So you could store a pattern and then bring up another page with a different pattern, and then another page with a different pattern. And so it was possible to sequence the different frames in the Dazzler while you were drawing on each of the frames, and create moving patterns on the screen. As they sequenced, the pattern would repeat as a moving pattern.

Then we got the frame buffer, which had much higher resolution and did real video in and out. And it was, I think, 256 by 256. And I remember capturing some images with that, and then through software, reducing the resolution and putting them into the

JONES (Cont.):   Dazzler. Because the frame buffer would capture a frame and play a frame. But because the Dazzler had this low-res repetition of multiple frames, we could capture images in the frame buffer and then put those images in the Dazzler and, in low-res, sequence the images and get this kind of motion playback through that. So it was similar to the resolution of the buffer that I made at Gary's place in the Catskills, except this was color. And because it had sixteen frames, you could play these patterns and repeat motion and stuff. That kind of led me to build my next frame buffer with multiple frames.

JIMINEZ: And that would've been what year, you started working on your frame buffer[?]?

JONES: I think in '79, I built the next version up from what I had made at Gary's place. Peer supplied the money to buy the parts, and we did a 256 by 256 single-frame frame buffer. So it was much better resolution than the sixty-four by sixty-four that was at Gary's.

JIMINEZ: So you were capturing, then, these single frames, and then you were trying to play them back at faster and faster rates over time? Or…

JONES: Well, you couldn't really— I mean, it was basically about capturing single frames or keying a portion of an image onto that single frame. So we would cut out some portion of the image using a key clip, and the static frame would then have this image

JONES (Cont.): moving over it. But it was a single frame. It didn't have multiple frames, so there was no repeating motion. There was no sequencing that happened of time capture.

JIMINEZ: Right.

JONES: It was just building up kind of a composite image by layering parts of the live image on top of the stored image. And then from there, decided that multiple frames were definitely needed. And the TV Center came up with the funding to do the frame buffer project. And so that was the same 256 by 256 converter, but with multiple frames. And that used a memory card that had sixteen frames per memory card. And so if you had multiple memory cards, you had multiples of sixteen. Sixteen, thirty-two, sixty-four frames. And then you got *real* motion. And that's what we've had at the TV Center since around that time, since the mid-eighties. That was, I think— I think we proposed it and tried to get the funding around '82. And we finally got the funding and finally actually built the boards around '85 for that.

JIMINEZ: So your first version, the one that captured single frames, you called the Jones Buffer, as well?

JONES: Well, I don't think— I mean, Ralph is the one who added my name onto the ends of all the machines that I built, so— And, you know, the sixty-four by sixty-four one was just the sixty-four by sixty-four Frame grabber. The other one was the 256 by 256

JONES (Cont.): frame grabber, or Peers Frame Grabber. And then by the time we etched

the boards and started making multiples of the final one in the eighties, Ralph had

decided that was the Jones Buffer. So like the Jones Colorizer, it got my name tacked

onto it.

JIMINEZ: Good idea.

JONES: Yeah. [they laugh] So this was not part of the four-board project? I don't really

want to get into the four-board project, but that was separate, the four-board, right?

JONES: Yeah.

JIMINEZ: Yeah, that was for colorizer, keyer, mixer—

JONES: Yeah, there were a few different projects back around those days.

JIMINEZ: So I think I read somewhere that you bought your first desktop computer in

1985. And I was wondering when the Amega started to appear, and how that got

integrated. Was it around the same time, the mid-eighties?

JONES: It was in the mid-eighties. I think I bought— My first computer that I bought

was a PC clone, which I bought because I had seen some computer generated printouts to

make circuit boards in the mid-eighties, at Alfred University. And actually, one of the

JONES (Cont.): boards that I made at that time was a printout on their big CAD system. And so I figured, Well, that's kind of the way things are going; I need a CAD system. So I bought a PC clone, and I bought one of the first versions of AutoCAD that came out back then, and started designing my circuit boards on the computer and printing them out on a little pen plotter, using felt pens; and then taking those pieces of paper down to a photo lab in Binghamton, and they would photograph them into double-sized lithos; and then I would send them to a circuit board house to have 'em made as circuit boards. I think that was around '85, when I got that machine. I don't remember exactly what month the Amega became available. I think I got mine about '86. Like the end of '86, something like that. There were a few people that had started to get them and were playing with them. And the graphics on them were incredible for the day. And so I couldn't afford to buy a complete system, but I met somebody who wanted a monitor, and I wanted the computer. Since it put out normal video, I could use my own video monitor for the computer monitor. And so I bought the complete system and sold him the monitor, and kept the computer part and started playing around with that.

JIMINEZ: So obviously, the Amega offered the, you know, Paintbox functions, it offered…

JONES: It had animation.

JIMINEZ: …animation…

JONES: It ultimately, over time, it added a lot of other things. It had—

JIMINEZ: And digitizing was also…

JONES: It had sound cards, it had video capture, it had a genlock. There was 3-D software made for it. There was animation software made for it, both vector based animation, as well as frame based animation.

JIMINEZ: So, I mean, but it wasn't doing control— it wasn't outputting control voltages.

JONES: No.

JIMINEZ: So that was kind of a shift, in a way, was it, in the…

JONES: Well—

JIMINEZ: …way computers were using the Center? And also by people like you, or…?

JONES: Well, at that point, I don't think there was… Well, no, there probably was one fairly early at the TV Center. But it was separate. I mean, the Cromemco was still used at the Center for a long time. And the Amega didn't replace that. The Amega was all about doing graphics and doing colored shapes moving around and stuff like that. I can't

JONES (Cont.): remember when the Center got its first Amega, but it was maybe a year or two after that. It was like '87, '88, I'm guessing. But I'm not really sure. And I think the first uses were basically flying triangles and ovals and things like that moving around. And then moving on to capturing video and doing sequences of video and stuff like that. So it did eventually replace the frame buffer part of the Cromemco, because the frame buffer was always kind of cranky and had loose wires, and never was really 100% predictable. Would work great for a while, and then it would start screwing up, and you'd have to go and wiggle wires and move connectors around. And then you'd get it working again, and you know, a few months later, then something would come loose again.

JIMINEZ: So could you talk about the similarities and differences between the frame buffer, your Jones Frame Buffer and the image capture parts of the Amega? Were they kind of just two different tools that did the same thing, or…?

JONES: Yeah. Well, they were fairly different. The Amega was actually a color device. So— you know, my frame buffer was never a color device. It was black and white in, initially black and white out, although I did make a colorizing type of a card for it, a color map card that assigned colors to the different shades of gray. So you had an alternate output that was like quantized color.

JIMINEZ: When would that have been?

JONES: It was done around the same time. By the time we finished the main boards, I

think that board came months later. So it was probably, you know, around '86, something

like that. Before I got my Amega. I'm pretty sure it was before that. And there were some

other kind of computers and graphics systems that were happening around that time. Like

the Zgrass system, through Tom DeFanti and the people in Chicago. Which was basically

a Bally video arcade game that had special software running on it.

JIMINEZ: Yeah, I wanted to actually ask you about that, because it seemed like— I

mean, that was… It did create patterns. You could create patterns with it, but it was really

a graphical device…

JONES: Right.

JIMINEZ: …as opposed to— I guess what I'm seeing here is that the initial interest,

maybe, in the Center was more toward control voltage, controlling video. And then as

graphic— And less about development of graphic systems. But also interest in frame

grabbing and capture.

JONES: Well, it was kind of an evolution of what the computer was capable of. The

early computers weren't capable of grabbing frames or putting out video. But they were

capable of manipulating voltages. And then the second generation ones started with the

control voltages, 'cause since it worked on the first one, that was where we obviously

kind of saw it going, to begin with. But then as different add-on cards became available

JONES (Cont.): for the second computer, then we added those features to it. So it then

became much more about being able to make video with it.

JIMINEZ: So what about the vector? I mean, was it that the vector systems were just not

affordable, but they were perhaps in Chicago, because it was the university lab that they

were using? Or do you think there just happened to be different personalities interested in

different—

JONES: You mean full vector systems, or…?

JIMINEZ: Well, what they were doing with the Zgrass, development of the Zgrass.

JONES: Well, yeah, that was— I mean, 'cause they were developing that based on, I

think, some commercial input that they had had and projects that they were working on,

and this was kind of applying it to a small computer to make similar kinds of things

happen. Whereas we didn't really have that commercial input[?], influence. We were just

kind of coming up with things on our own or adapting what we could find off the shelf to

be able to do with— you know, to take a piece of equipment off the shelf and adapt it to

do something different.

JIMINEZ: So it was probably more serendipitous and less philosophical.

JONES: Yeah. I think it was just a matter of situation and influences that were around

the different groups of people. What resources they had available to them and, you know,

directions they got pushed in by the places that were providing funding.

JIMINEZ: Right.

JONES: So… And we were mostly funded by art organizations and by ourselves, so—

whereas—

JIMINEZ: And the Arts Council, which was open to development of tools [inaudible]

JONES: Right. Yeah. And so basically, we'd throw out ideas, and once in a while they

would say ok. We threw a few out that they didn't say ok, so you know… It happened

both ways.

JIMINEZ: Though eventually, I guess, the computer— the control voltage part of

computers just kind of faded away. It's not a very useful part of the [inaudible]

JONES: [over Jiminez] As it kind of progressed, things like MIDI came out, which were

really designed around getting music, and then control voltages for audio synthesizers; or

just the types of audio synthesizer devices and modules that were available really could

provide a lot of the same kind of functions that we had been trying to do with the

computer with control voltages. So it really ultimately came down to not being as useful

JONES (Cont.): for doing the control voltages, just because there were other ways of doing it. It wasn't that the computer wasn't good at it, but there were other devices that would do that same kind of thing.

JIMINEZ: And they were integrated into the system at the Center.

JONES: Eventually, yeah. I mean, as we added different parts of the system. We had our own control voltage boxes that we did a lot with. And then we added various outside commercial synthesizer, like the core[sp?] control voltage processing and audio processing box. Stuff like that. And eventually, some MIDI interfaces that were control voltage in and out to MIDI. So you know, the computer became less targeted towards control voltages, and…

JIMINEZ: Right.

JONES: You know, it made much more interesting video images.

JIMINEZ: So did you want to ask something, Kathy? Did you have anything more about the— I mean, I guess were you aware of any other people that were working on— after, you know, you did the frame buffer and— that were still working on kind of custom tools, even though there had been this shift, where now there were, you know, desktop computers and the Amega and, you know, improved graphics and interfacing with video?

JIMINEZ (Cont.): Were there still custom devices that were being built? Or was there really no need for that at that point?

JONES: There were, but they were kind of shifting direction. You weren't really seeing much in the way of, like, analog video processing or anything like that coming out as custom devices. You were seeing people doing stand-alone devices for a specific application or for a specific artwork. There were some people that built video frame buffers and colorizer type circuitry— or not really colorizer, but sort of that same color look-up type stuff that I was talking about doing with the color outputs of the black and white buffer. But building that type of thing into a box, and then selling that as part of an artwork, so that the artwork had this kind of black box that the video camera went through and created the effect with whatever was happening on the camera.

JIMINEZ: So was it more at a software level, then, than a hardware level?

JONES: Well, at that point, it was still hardware, because software wasn't fast— It's only been very recently that software can go fast enough to actually create video.

HIGH: Recently, as of?

JONES: Well, I'd say the last five, six years, it's been fast enough. And it's only even the last couple years, where it's fast enough to really go at full speed. Even five years ago, you could get video images out, but if you did much processing to 'em, you were

JONES (Cont.): down to fifteen frames or ten frames a second. Whereas now, the

computers are fast enough you can get a full thirty frames a second, and still process the

image a reasonable amount in real time, without losing the quality or giving up the frame

rate. And the computers are still escalating in speed, you know, year by year. So now

you're getting to the point where you could be doing HD or doing multiple channels of

video, and still pretty much keeping up with the full video rate going through it. But you

know, up until I would say the early twenty-first century, the computer could only really

control hardware that would process video. It couldn't really do the video in software

directly. It couldn't create the pixels in real time, or you know, not at full resolution, full

speed.

JIMINEZ: Right. So maybe— I mean, I guess I'm trying to link, you know, sort of what

was happening at the Center to some of the—if there is a link—to some of the tool

development now, which there's a lot of software development, not as— I mean, perhaps

some hardware as well. I guess I'm—

JONES: Yeah, I don't think there's a direct link, in a way, but there's a lot of influence. I

think that a lot of people that were developing software for doing image manipulation

saw things that came out of the Center, or saw things that came out of other places like

that, and that was their sense of, What do we want to make the computer do in processing

an image? Because, you know, I mean, a lot of them, the software begins by emulating

your classic SEG. And then when the designer of the software sees something more

complicated coming from somewhere else, then they start adding that. A lot of the

JONES (Cont.): software development hasn't been totally out of the blue development, you know, based on their own pure concepts. Some of it has, but I would say the majority of it hasn't. Most of it is mimicking things that they've seen somewhere else.

JIMINEZ: And this, in general, you say, were people that are related to the Center? Or are you just saying in general?

JONES: No, I'm talking in general, with software that's being developed all around the world that's being used to create or process video images. And you could even see it in the eighties, when things like the Video Toaster were being created. And the capabilities of the Video Toaster were based very largely on your classic SEG from a TV studio, because that's what the designers had seen. And so that's where they got their ideas, and that's what they then created, a kind of a new version of it. And then as they saw other types of devices and other images that were created, that came out of places like the TV Center, then those designers added features like that to their software and hardware. And the same thing's happening now with the pure software version of image manipulation. They're seeing old videotapes, or current videotapes, being processed with analog control voltage type video stuff, and then they're building those type of effects into their software.

JIMINEZ: Right, [inaudible] MSP and Jitter.

JONES: Yeah, and Jitter. And some of the overlays and processes there, some of them are taken from kind of classic video synthesizer type of effects. That, you know, they each design a little module to do some core effect, and then that adds to the features of the whole system. But a lot of the initial effects were just basic keyer or colorizer. You know, and then they've grown from there. So I think that it isn't that the designers of that kind of software ever went to the TV Center, but I'm fairly certain that they saw tapes that came out of the TV Center, or places like the TV Center.

JIMINEZ: Or places where custom [inaudible]

JONES: [over Jiminez] Where other custom hardware was put together, yeah. And then that influenced their directions.

JIMINEZ: So anything else, Kathy, about the computer?

HIGH: No, I think you guys have covered it.

JIMINEZ: And so—

HIGH: It's really good. It's really good.

JIMINEZ: I know you wanted to ask about— Kathy wanted to know about— Now, you did the laserdisc synchronizer, which we know is now— laserdiscs are no longer being used; now we're doing DVD synchronizers. Just curious about what your next, you know, project, device, format, whatever will be.

JONES: I'm jumping into a little time machine and I'm going back to the seventies and early eighties, and I'm going to be building an analog video synthesizer. I'm taking a cue from the kind of explosion of audio synthesizers that's out now, where there's ten times as many companies now as there were in the sixties and seventies making audio synthesizers. And some of them are even better quality than anything that came out back then. And they're small and modular. Some of them are huge and, you know, they're like the old Moog synthesizers and would fill a room. But some of them are small and briefcase sized, and still put out really nice control voltages in audio. And I think I can build a whole series of analog video synthesizer modules that'll fit into the same size frames, take their control voltage as control voltages in, as well as make some of my own kind of video specialized control voltage stuff. But for the most part, just use their analog and oscillator type modules as the control voltage sources, but provide all of our kind of classic TV Center style video synthesizer modules, and add them to the mix of what the audio synthesizers are doing now. I think there's a lot of video VJs out there that would love to get their hands on just a patchable analog video synthesizer, as well as artists and other people that play around with audio synthesizers and play with music, that would like to mix some video in with that. And even a lot of the people just doing pure audio

JONES (Cont.): synthesis type stuff would like to do video while they're doing the audio. Like in a concert type of a situation.

JIMINEZ: So this is sort of a contrast to the now software, like MX[?] MSP Jitter people were doing everything in the computer…

JONES: Right.

JIMINEZ: …and then this would be a complement to that, and also kind of a contrast to that.

JONES: Yeah, and a contrast. I mean, there are a lot of audio synthesizer programs that are in the computer, and the computer is much faster and much more powerful in doing audio than video, even. But there are a lot of people that have decided that the actual analog audio processors, audio synthesizers sound different. And I think the same is true with the video. That, you know, the computer generated video synthesized type stuff has a look to it and has limitations that I think a patchable analog video synthesizer will have fewer of those limitations.

JIMINEZ: And so you could have an analog or a digital input, in terms of the source video, and then out, same?

JONES: Yeah.

JIMINEZ: Either analog or digital [inaudible].

JONES: Yeah, the stuff that I'm going to do initially is analog in, analog out. It's

basically— it's like what we have at the TV Center, except it'll fit in a suitcase. And kind

of something Ralph was talking about, even from the late seventies, of putting the TV

Center in a suitcase so everybody could have one and take it with them. And so now I'm

kind of aiming in that direction. And it's, you know, twenty years late, but I think it's

going to happen.

JIMINEZ: Fantastic.

HIGH: This sounds great. Sign me up. [they laugh] I'm so ready for it!

JONES: I've developed the basic concept for about fifteen to twenty modules at this

point, and I've started prototyping a few of them. So sometime maybe late this year, I'll

have a system out.

HIGH: Oh, that's so exciting.

JIMINEZ: Wow. So we'll actually have some—

HIGH: It's so interesting. The Center in a box.

JIMINEZ: Yeah, and also, actually have some tonal range to video. That's what I want.

[they laugh] That's my goal, tonal range.

JONES: Yeah. Well, and it can still be used with the, you know, Jitter and those type of things. You know, you can feed the output of Jitter as an analog signal, through a FireWire conversion box, feed it into the analog processing stuff, process it through those modules, and then feed it back to analog to FireWire, and back into Jitter. So you can— Or you can go the other way, where you do it— You know, Jitter becomes a module on the analog side, or the analog stuff becomes a module on the Jitter side. It can work either way, depending on which one you're more focused on. And just like the audio synthesizers can work in conjunction with the computer audio synthesizers.

JIMINEZ: Well, I'm surprised and delighted. [they laugh] But I wouldn't have predicted—

HIGH: [over Jiminez; inaudible] I love it. I knew you were up to something.

JONES: Yeah, I'm up to something.

HIGH: I knew you were up to something good.

JONES: Yeah, well, that's been— I've actually been planning this for about a year-and-a-half, almost two years now. And been working on prototypes for over a year.

HIGH: That's fantastic. Thank you, David.

JIMINEZ: Thank you so much.

JONES: Sure.

HIGH: Thank you so much. Thank you, Mona.

JIMINEZ: You're welcome. Thank you, Kath.

HIGH: Goodbye.

JONES: Bye. [Jiminez laughs]

[END]